GCSE MARKING SCHEME

AUTUMN 2024

GCSE
MATHEMATICS
UNIT 2 – INTERMEDIATE TIER
3300U40-1

About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

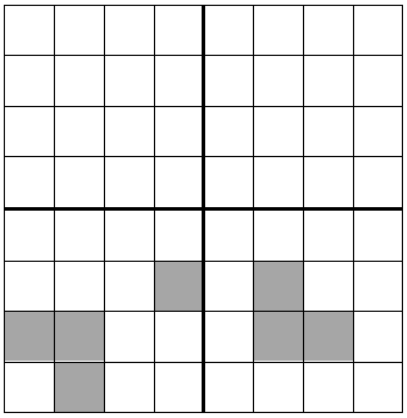
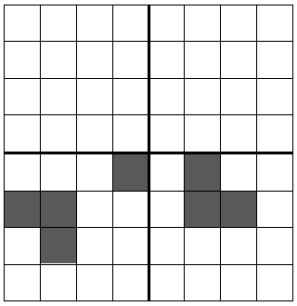
This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

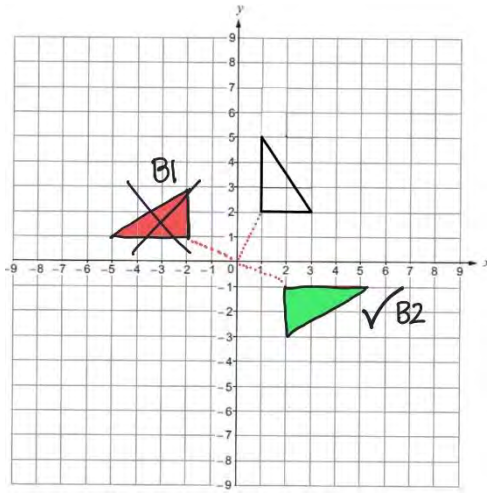
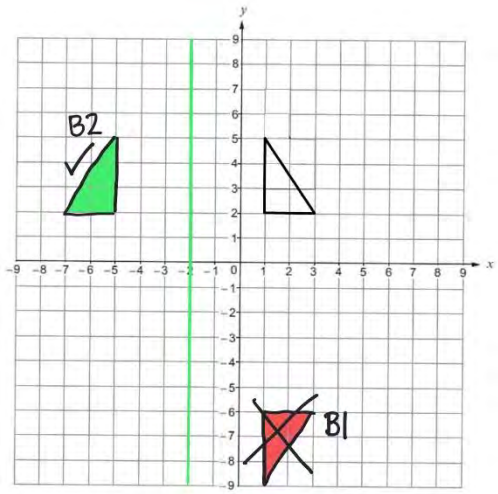
WJEC GCSE MATHEMATICS

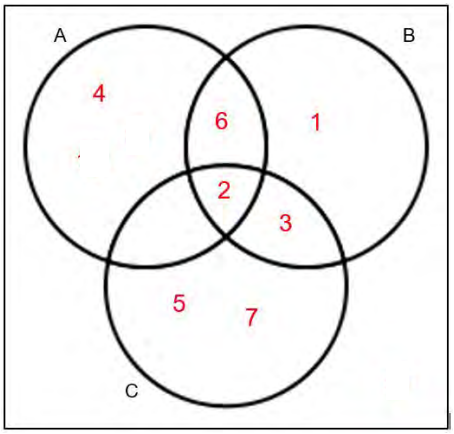
AUTUMN 2024 MARKING SCHEME

GCSE Mathematics **Unit 2: Intermediate Tier**	Mark	Comments
1.(a) (x =) 180 – 62 × 2 or equivalent 56(°)	 M1 A1	Check diagram for answers. Answer line takes precedence. Note: 180 – 124. Award M1 for complete method or intention of complete method provided not contradicted e.g. brackets missing 180 – 62 + 62 = 58 M1 A0, 180 – 62 + 62 = 180 M0 A0. CAO.
1.(b) ($Q\hat{R}S$ =) 102(°) (y =) 360 – (115 + 60 + 102) or equivalent. = 83(°)	 B1 M1 A1	Check diagram for answers. Answer line takes precedence. Note: 360 – 277. Award M1 for complete method or intention of complete method provided not contradicted e.g. brackets missing 360 – 115 + 60 + 102. FT for M1 and a possible A1 185 – 'their 102' provided $y > 0$ and 'their 102' is: • not 78 (unless $Q\hat{R}S$ = 78 is stated or on diagram) • not 254.
2. One example of a **pair** of relevant rectangles or squares considered **with** the longer side correctly doubled and the shorter side correctly halved. Correct method of finding the perimeter of either rectangle/square. Correct perimeters found for **both** rectangles/squares **AND** statement that Owen is incorrect (or a statement that the perimeters aren't the same).	S1 M1 A2	Sketch shown or lengths clearly stated. FT one of 'their rectangles/squares' if lengths/width explicitly stated or shown on diagram. If only one rectangle or square is considered, award S0M1 if the correct perimeter or method of finding the perimeter is shown. Award A1 for one of the following: • one correct perimeter and a correct statement for 'their rectangles/squares' • both perimeters correctly evaluated for both 'their rectangles/squares' without a statement. Ignore additional comments about area. If area is used instead of perimeter: **S1** can be awarded for one example of a pair of relevant rectangles or squares considered <u>and</u> an additional **SC1** could be awarded for their two (clearly identified) correct areas **AND** statement that Owen is correct.

Organisation and Communication. Accuracy of writing.	OC1 W1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc
3.(a) 89·06 or $\frac{4453}{50}$	B2	B1 for sight of any of the following: • 89(·0) • 89·1 • 89·06% • 8·33 • 80·73.
3.(b) $\frac{19.44}{36}$ (× 100) or equivalent 54(%)	M1 A1	Allow 0·54 or $\frac{27}{50}$ for M1.
4. 	B3	B1 for each individual shape. Penalise −1 if **more** than 7 squares are shaded. Ignore clearly deleted shading. If no marks, award SC1 for the response below. 
5.(a) $\frac{1}{7}$	B1	
5.(b)(i) $\frac{2}{7}$	B1	

5.(b)(ii) $\frac{2}{7} \times 91$ 26	M1 A1	May be seen in stages. FT 'their (b)(i)'. Allow '26 out of 91' for M1A1. Award M1A0 for a final answer of $\frac{26}{91}$. Allow truncated or rounded answers if following through 'their (b)(i)'. Note: $\frac{2}{5} \times 91 =$ 36·4 or 36 or 37 $\frac{1}{7} \times 91 =$ 13 $\frac{4}{7} \times 91 =$ 52 $\frac{4}{5} \times 91 =$ 72·8 or 72 or 73
6.(a)(i) $3y = 24$ or $y = 24/3$ $y = 8$	B1 B1	FT from $3y = k$. Mark final answer. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction or a decimal rounded or truncated to at least 1 decimal place. Unsupported answer of 8 is awarded B1 B1. Allow an embedded answer but penalise -1 if contradicted by $y \neq 8$.
6.(a)(ii) $14t + 21 = 56$ OR $2t + 3 = 8$ $14t = 35$ OR $2t = 5$ $t = \frac{35}{14}$ OR $t = 2{\cdot}5$	B1 B1 B1	FT until 2nd error. Accept any value equivalent to 2·5. Mark final answer. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction or a decimal rounded or truncated to at least 1 decimal place. Unsupported correct answer is awarded B1 B1 B1. Allow an embedded answer but penalise -1 if contradicted by $t \neq 2{\cdot}5$ or equivalent.
6.(a)(iii) $8p - 3p = -25 - 5$ OR $5 + 25 = 3p - 8p$ $5p = -30$ OR $30 = -5p$ $p = -6$	B1 B1 B1	FT until 2nd error. Mark final answer. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction or a decimal rounded or truncated to at least 1 decimal place. Unsupported answer of –6 is awarded B1 B1 B1. Allow an embedded answer but penalise -1 if contradicted by $p \neq -6$ or equivalent.

6.(b)	$w(w-6)$	B1	Allow • $w \times (w-6)$ • $w(-6+w)$ • $w \times (-6+w)$.
7.	5 (more yellow counters)	B2	Answer line takes precedence. Award B1 for sight of one of the following: • $\frac{6}{8}$ but not $\frac{3}{4}$ • 6 yellow counters as a final answer • 8 counters in total • evidence of trialling e.g. sight of at least two of $\frac{2}{4}, \frac{3}{5}, \frac{4}{6}, \frac{5}{7}, \ldots$
8.(a)	Correct rotation. 	B2	Allow B1 for one of the following: • two correct vertices • a 90° anticlockwise rotation about the origin • a correct rotation with only one other incorrect rotation seen.
8.(b)	Correct reflection in $x = -2$ 	B2	B1 for one of the following: • line $x = -2$ drawn (do not award this B1 for one side of a triangle drawn on the undrawn line $x = -2$) • correct reflection in line $y = -2$ • a correct reflection with only one other incorrect reflection seen.

9. 	B4	Ignore numbers crossed out. Numbers repeated in more than one subset, 0 or numbers greater than 7 should not be credited. Allow repeated numbers in the same subset. Award B4 for correct answer only (all 7 numbers in correct position with no other or repeated numbers). Award B3 for one of the following: • 7 numbers in correct position with other numbers • 5 or 6 numbers in the correct position Award B2 for 3 or 4 numbers in correct position. Award B1 for 2 numbers in the correct position.
10. (Number of 50p coins =) (£)19.20 ÷ (£)0.20 ÷ 8 × 5 or equivalent	M2	May be seen in stages. May be seen in any order. Award M1 for one of the following: • (£)19.20 ÷ 8 × 5 (=(£)12) • 96 (number of 20p coins (£)19.20 ÷ (£)0.20 or 19.20 × 5) • (£)19.20 ÷ (£)0.20 ÷ 8 (=12) • 'their derived number of 20p coins' ÷ 8 • 12 • (£)19.20 ÷ 8 • (£)2.4(0)
(Number of 50p coins =) 60	A1	CAO. May be implied in further working.
(Value of 50p coins = 60 × (£)0.5(0)=) (£)30(.00)	A1	FT 'their 60' × (£)0.5(0) **provided M2 awarded** and 'their 60' is rounded or truncated if required to a whole number of coins. May be implied in later working.
(Total value of coins = (£)19.20 + (£)30 =) (£)49.2(0)	A1	FT provided M2 or M1 awarded (£)19.2(0) + 'their 60' × (£)0.5(0). If no marks, award SC1 for sight of (8 × (£)0.2(0)=) (£)1.60 **and** (5 × (£)0.5(0)=) (£)2.50 or equivalent.

11. One correct evaluation $0 \le x \le 1$ 2 correct evaluations $0{\cdot}65 \le x \le 0{\cdot}85$, (**one value < 0, one value > 0**) 2 correct evaluations $0{\cdot}65 \le x \le 0{\cdot}75$, (**one value < 0, one value > 0**) $x = 0{\cdot}7$	B1 B1 M1 A1	*Correct evaluation regarded as enough to identify if < 0 or > 0.* *If evaluations not seen accept 'too high' or 'too low'.* x / $x^3 + 5x - 4$ (check $x^3 + 5x = 4$) 0 -4 0.1 -3.499 0.2 -2.992 0.3 -2.473 0.4 -1.936 0.5 -1.375 0.6 -0.784 **0.7 -0.157** **0.8 0.512** 0.9 1.229 1 2 0.65 -0.475 0.73 0.039 0.74 0.105 **0.75 0.172** 0.85 0.864 Unsupported $x = 0{\cdot}7$ is awarded B0B0M0A0. An answer of $x = 0{\cdot}7$ can only be awarded B1B1M1A1, following sight of 2 correct evaluations $0{\cdot}65 \le x \le 0{\cdot}75$ with one evaluation < 0 and one evaluation > 0.
12. Five values that satisfy both conditions: • Total = 22·5 • **Unique mode** = 3·5 3·5 3·5 3 **different** values that total 15·5 3·5 3·5 3·5 2 values that total 12 3·5 3·5 3·5 3·5 8·5	B3	May be written in any order. Answer boxes take precedence. Award B2 for one of the following: • 5 values that total 22·5 • sight of 5 × 4·5 and 5 values with a unique mode of 3·5 • sight of 22·5 and 5 values with a unique mode of 3·5. Award B1 for one of the following: • sight of 5 × 4·5 • sight of 22·5 • 5 values with a unique mode of 3·5. If answer boxes are blank, the 5 values need to be clearly identified in the working space.
13. (Number of sides =) $\frac{360}{180 - 171}$ = 40 (sides)	M2 A1	Award M1 for sight of one of the following: • 180 – 171 • an appropriate 9. CAO. Allow an embedded answer but penalise -1 if contradicted by number of sides ≠ 40.
13. Alternative method $\frac{(n-2) \times 180}{n} = 171$ *or* $180n - 360 = 171n$ *or equivalent* $9n = 360$ *or equivalent* $n = 40$ *(sides)*	*M1* *m1* *A1*	*Brackets may be implied by later correct work.* *CAO.* *Allow an embedded answer but penalise -1 if contradicted by number of sides ≠ 40.*

14.(a) $(AC^2 =)\ 13\cdot5^2 + 10\cdot8^2$ or equivalent $(AC =)\ \sqrt{13\cdot5^2 + 10\cdot8^2}$ or equivalent $(AC =)$ 17·3 or 17·2(88…) or 17·29 or $\frac{27\sqrt{41}}{10}$ (cm)	M1 m1 A1	Check diagram for answers. $(AC^2 =)\ 182\cdot25 + 116\cdot64 = 298\cdot89$. $(AC =)\ \sqrt{298\cdot89}$. Sight of √'their 298·89' or √'their 298·89' evaluated is awarded m1 provided M1 previously gained. CAO. Mark final answer. Allow 17 provided from correct workings. Final answer of $AC = 298\cdot89$ is M1m0A0. Accept a rounded or truncated answer. An unsupported correct answer is awarded M1m1A1.
14.(a) Alternative method ***Correct** use of a two-step trigonometric method* *(AC =)* *17·3 or 17·2(88…) or 17.29 or $\frac{27\sqrt{41}}{10}$ (cm)*	*M2* *A1*	*A partial trigonometric method is awarded M0.* *CAO.* Mark final answer. *Allow 17 provided from correct workings.* *Accept a rounded or truncated answer.*
14. (b) $(x =)\ \tan^{-1}\frac{19\cdot8}{8\cdot7}$ An answer in the range 66·2 to 66·32	M2 A1	Check diagram for answers. Award M1 for $\tan x = \frac{19\cdot8}{8\cdot7}$ (= 2·275(8..) Mark final answer. Allow 66 provided from correct workings. Accept a rounded or truncated answer. Allow correct angles given in radians or gradians.
14.(b) Alternative method ***Correct** use of a two-step trigonometric method* *An answer in the range 66·2 to 66·32*	*M2* *A1*	*A partial trigonometric method is awarded M0.* Mark final answer. *Allow 66 provided from correct workings.* *Accept a rounded or truncated answer.* *Allow correct angles given in radians or gradians.*

	Radians	Gradians
$\tan^{-1}\frac{19\cdot8}{8\cdot7}$	1·1567…	73·6440…

15. Correct bisector of 60° Arc of radius 5 cm, centre B. Correct region identified.	 B2 B1 B1	Allow a tolerance of ± 2° and ± 2 mm. The construction need not be below the line for the B2 and the first B1 (but the final B1 won't be awarded). Allow at A or B. Correct construction arcs (initial and secondary) must be seen or an alternative valid method. The angle must be formed for the bisector and the line must reach the intersection of the arcs. Award B1 for one of the following: • correct construction of 60° at A or B. The initial and secondary construction arcs must be seen but line forming the angle may not need to be seen (depending on method) • correct bisector of 'their acute angle' at A or B. The initial and secondary construction arcs and bisector line must be seen and reach the intersection of the arcs. For B1, the arc must be of sufficient length so as not to be considered a 'point' or a 'notch' i.e. for a sector of at least 10° at B. For this B1, the region must be: • in the correct location at B • below the line • include an angle • include an arc. FT if at least B1 previously awarded.
16.(a) Sight of 0·032 or equivalent e.g. 3·2% or $\frac{160}{5000}$ Explanation e.g. 'all data used', 'last point plotted', 'the number of batteries checked was the highest'.	B1 E1	Answer line takes precedence. ISW. Allow incorrect probability notation e.g. 160 out of 5000. Accept any indication that the final reading should give the best estimate. Allow 'the more times you repeat an action, the more accurate the estimate is'.

16.(b)		May be done in any order.
$3000 \times 0{\cdot}033 \times 0.026$ or $3000 \times 0{\cdot}033 \times 2.6$	M2	May be seen in stages or implied in later working. Award M1 for sight of one of the following, allowing one place value error in 0·033 or 0.026 (may be embedded): • $3000 \times 0{\cdot}033$ • 99 • $3000 \times$ (£)0.026 • 3000×2.6(p) • (£)78 or 7800(p) • $0.026 \times 0{\cdot}033$ • $2.6 \times 0{\cdot}033$ • 0·000858 • 0·0858. Award M1 for sight of the consecutive digits 99 or 78 or 858 in a number involving a place value error e.g. 990 but not 8990.
(£)2.57(4) or 257(.4)(p) ISW	A1	CAO. Allow (£)2.58 or 258(p) (If units are given they must be correct). Incorrect units may imply M2 A0. Award M1 A0 for one of the following answers: Answer / From 2(.)34 / $(3000 \times 0.026 \times 0{\cdot}03)$ 2(.)10(6) or 2(.)11 / $(3000 \times 0.026 \times 0{\cdot}027)$ 2(.)62(2) / $(3000 \times 0.026 \times 0{\cdot}029)$ 2(.)49(6) or 2(.)50 / $(3000 \times 0.026 \times 0{\cdot}032)$
17. (Area of top or bottom =) $\pi \times 10^2$ ($\times$ 2)	M1	May be seen or implied in later working. Award M1 for sight of an appropriate answer between either: • 314 and 314·2 (cm^2) inclusive • 628 and 628·4 (cm^2) inclusive.
(Curved surface area =) $2 \times \pi \times 10 \times$ height or equivalent (e.g.62·8(31...) × **h**)	M1	May be seen or implied in later working.
(Height =) $\frac{1570{\cdot}8 - \pi \times 10^2 \times 2}{2 \times \pi \times 10}$ (= $\frac{942{\cdot}48)}{62{\cdot}83}$ or $\frac{1570{\cdot}8}{2 \times \pi \times 10} - 10$ or equivalent	M2	Award M2 for isolating the height term. FT for M2 or M1 for 'their $\pi \times 10^{2}$' $\times$ 2 and 'their $\pi \times 20$', provided that: • π used when calculating the areas • 'their $\pi \times 10^{2}$'$\times$ 2 < 1570·8 (including using radius = 5cm and diameter = 10cm). Award M1 for equating the three **areas** to 1570·8 but not isolating the height term e.g. • $\pi \times 10^2 \times 2 + \pi \times 20 \times$ height = 1570·8 • $200\pi + 20\pi \times$ height = 1570·8 • $628{\cdot}32 + 62{\cdot}83 \times$ height = 1570·8 • $62{\cdot}83 \times$ height = 942·48 • $20\pi \times$ height = 942·48 • $2\pi \times 10(10 +$ height$) = 1570{\cdot}8$
Answer between 14·99 and 15·02 (cm) inclusive	A1	CAO.

18. (a) $45x + 23y = 89520$ or $23y + 45x = 89520$	B1	May be seen in part (b) as long as not contradicted by an incorrect equation in part (a). Award B1 if 89 520 or $45x + 23y$ seen in the table in (a), but $45x + 23y = 89520$ seen in (b).
18.(b) Method to eliminate one variable e.g. equal coefficients AND an appropriate intention to subtract or add (whichever is appropriate) or use a method of substitution. First variable found (The number of seated tickets sold, x =) 1560 or (The number of standing tickets sold, y =) 840 Second variable found.	 M1 A1 A1	No marks for 'trial and improvement'. No marks for unsupported answers. Answer lines take precedence. FT 'their equation' from (a) if of equivalent difficulty (e.g. both the coefficients of x and y are ≠ 0 and ≠ 1). Allow one error in one term (not the term with equal coefficients). CAO FT substitution of their '1st variable' evaluated correctly, provided M1 gained. If **both** correct answers are seen in working space, but contradicted on answer lines, award M1A1A0. Treat reversed answers as a slip (M1A1A1).